ST400 Series
Boost Gauge

USER MANUAL

(541006-001)

Preface

Congratulations

Congratulations on choosing a Stack Boost gauge.
This instrument will give you a wealth of track-side performance information to enable you to obtain the maximum from your vehicle.

Registration Form

Please complete and return the registration form contained in the package.
This will allow us to keep you up to date on the latest developments from Stack.

Purpose of this manual

This manual will help you install your Boost gauge. It explains how to set up and configure the system for your vehicle.

Related Products From Stack Limited

If you need information about other Stack motor sport products, these can be obtained from Stack or from your local Stack dealer. Products available from Stack include:

- Intelligent Tachometers
- Speedometers
- Lap Timing Systems
- Analogue Sensors
- Digital Sensors
- Data Logging Systems
- Display and Logging Systems
- Display and Analysis Software

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INTRODUCTION

The range of STACK Boost gauges has been designed and developed from the highly successful, award winning STACK Intelligent Tachometer.

Also in common with the range of highly respected Stack Intelligent Tachometers, the driver display consists of a high precision positive drive mechanism, which ensures accurate information is being displayed under all circumstances.

The full list of features available on Boost gauges is as follows:

- **Positive needle boost display**
- **Maximum boost tell-tale**
- **Over boost warning light**

Standard Boost gauge Items

The Boost gauge is supplied with the following standard components:

Quantity	*Description*	*Part No.*
1	ST400 Series Boost gauge	as supplied
1	Boost gauge Fixing Kit (Including the following)	ST584
1	Switch Kit (2 switches)	ST510
1	Panel mount over boost Light	ST537
1	Boost gauge Harness	ST594-204
1	Boost gauge User Guide (This Document)	541006-001

INSTALLATION

MECHANICAL INSTALLATION

1. The Boost gauge should be fitted in an 80mm (3.15in) diameter and secured using the fixing bracket supplied. It may be mounted in the hole at any angle of rotation for best viewing by the driver.
2. The 2 switches **MUST** be installed for the Boost gauge configuration and functions to be available. Take care in positioning these 2 switches as they need to be pressed simultaneously for some functions.
   Label the switches '**M**' for **M**ax and '**R**' **R**eset.
3. The Over boost Light should be fitted in a position where it can easily be seen by the driver whilst driving.

ELECTRICAL INSTALLATION

The Boost gauge is supplied with a fully-wired harness to simplify wiring.

1. Fit the connector into the rear of the Boost gauge.
2. Fit the leads marked '**M**' and '**R**' to the two switches.
3. Fit the lead marked '**SL**' to the Over boost Light.
4. The long red (**B+**) and black (**B-**) wires should be connected to the battery Positive and Negative respectively.

   Note: This Boost gauge is for use on NEGATIVE earth vehicles only.

5. The black 4 way (MSS) plug is for the boost sensor connection ST453 (not supplied).

INSTALLATION NOTES

The following Installation notes will help ensure good results if wiring the Boost gauge with your own harness:

Connector The plastic connector has the pin numbers marked on the wire entry face. These may be used to ensure correct connection. If additional wires are required they should be insulated, multi-stranded cable of minimum current rating 5 Ampere

Supply The supply to the Boost gauge should be within the range 8-16 volts DC - Positive connection to Pin 1 and negative to Pin 3. Pin 3 should be connected to the negative of the battery, either directly, or by connecting to existing wiring. Indirect connections to the vehicle chassis cannot be relied upon.

Switches The switches supplied with the system are of a 'momentary action normally open' type and should be connected to the switch input on the 9 way connector and battery negative. Additional switch kits are available from Stack - request Part No. ST510.

Outputs The output (pins 4) is an 'open-collector transistor' type. This is probably best thought of as an electronic switch connected on one side to battery negative. The load on the output should therefore be connected between battery positive and the relevant output. The maximum current which may be switched via either output is 0.2 Amperes and therefore they may be used to drive a lamp directly or larger loads and/or other equipment via a relay.

TESTING

Once the installation has been completed the Boost gauge may be powered up. When power is applied the needle should initially move to behind the Stack logo, when a slight buzz may be heard, and then be driven forward and stop at approx. 1 Bar (zero position with no ST453 connected). The green LED behind the STACK logo should be illuminated as a backlight.

Start the engine and watch the Boost gauge. As the throttle setting is gradually increased the needle should rise in small steps and when the RPM is held steady should show a reasonably constant boost reading.

If the Boost gauge is powered off with the engine still running, the needle will stay at whatever boost was being displayed when the power was removed. Further tests may only be carried out after reading the following chapter.

OPERATING THE BOOST GAUGE

GENERAL

All functions of the Boost gauge are accessed via the two push-button switches attached via the 9 way connector. The main functions which are accessed in this way are as follows :

- **Tell-tale maximum display**
- **Reset tell-tale display**
- **Over boost indicator**

BOOST GAUGE FUNCTIONS

Switch Functions

All the functions of the Boost gauge are obtained by pressing either of the push button switches, labeled **M**ax and **R**eset. These functions and the switches that obtain them are given in the following table:

Functions available on Boost gauges

Standard Function	Max Boost	Run/Stop Reset	Time Pressed	Comments
Max Boost	Max		More than 0.5Sec	Needle moves to maximum recorded boost
Reset Max		R	1 Sec	
Set Over boost	R		2 Sec	Needle moves to current setting (0.05 Bar factory setting)
Increase	Max		As Required	Move needle to required Over boost
Decrease		R	As Required	
Exit	~~Max~~	~~R~~	3 Sec	Neither button pressed - needle reads actual Boost
Self Test	Max ↘	R	5 Sec	RED LED on. Needle moves around scale & then to zero.

Key Press Sequence			
	Max	=	Press Max RPM Switch Only
	R	=	Press Run/Stop Switch Only
	Max ↘	=	Press & hold Max Switch Then press Run switch
	R		

General Operation

Display Boost

The Boost gauge will always show the current boost value of the engine, regardless of any other functions being performed simultaneously, unless the dial face is being used by that function. e.g. Show Max, Set Over boost.

View Maximum boost

The maximum value of boost measured will be continuously updated automatically and may be viewed by simply pressing the **M**ax switch. The value displayed will be the highest value measured since the tell-tale memory was last reset.

Reset Maximum boost

The tell-tale may be reset at any time by using the **R**eset switch. This switch should be held pressed for approximately 1 second.

Set Over boost

There is an Over boost light output which may be adjusted using the dial and switches attached to the system.

This Over boost limit controls the electrical output on pin 4 of the 9 pin connector. The output will switch 'ON' whenever the over boost setting is exceeded and can be used to switch a lamp to indicate over-boost.

To set the Over boost press and hold down the **R**eset switch for 2 seconds. The needle will then move to show the current setting.

This setting may be adjusted at this time by using the two switches individually. The **M**ax switch will increase the setting and the **R**eset switch will reduce it.

When the Boost gauge detects that neither switch has been pressed for 3 seconds it will exit the Over boost setting mode.

Self-test Functions

The correct operation of the Boost gauge may be confirmed at any time using this feature. The tachometer is put into 'Self-Test' mode by first pressing and holding down the **M**ax switch, pressing the **R**un switch and then continuing to hold down both switches for 5 seconds. The needle should then move around the scale and back to zero.

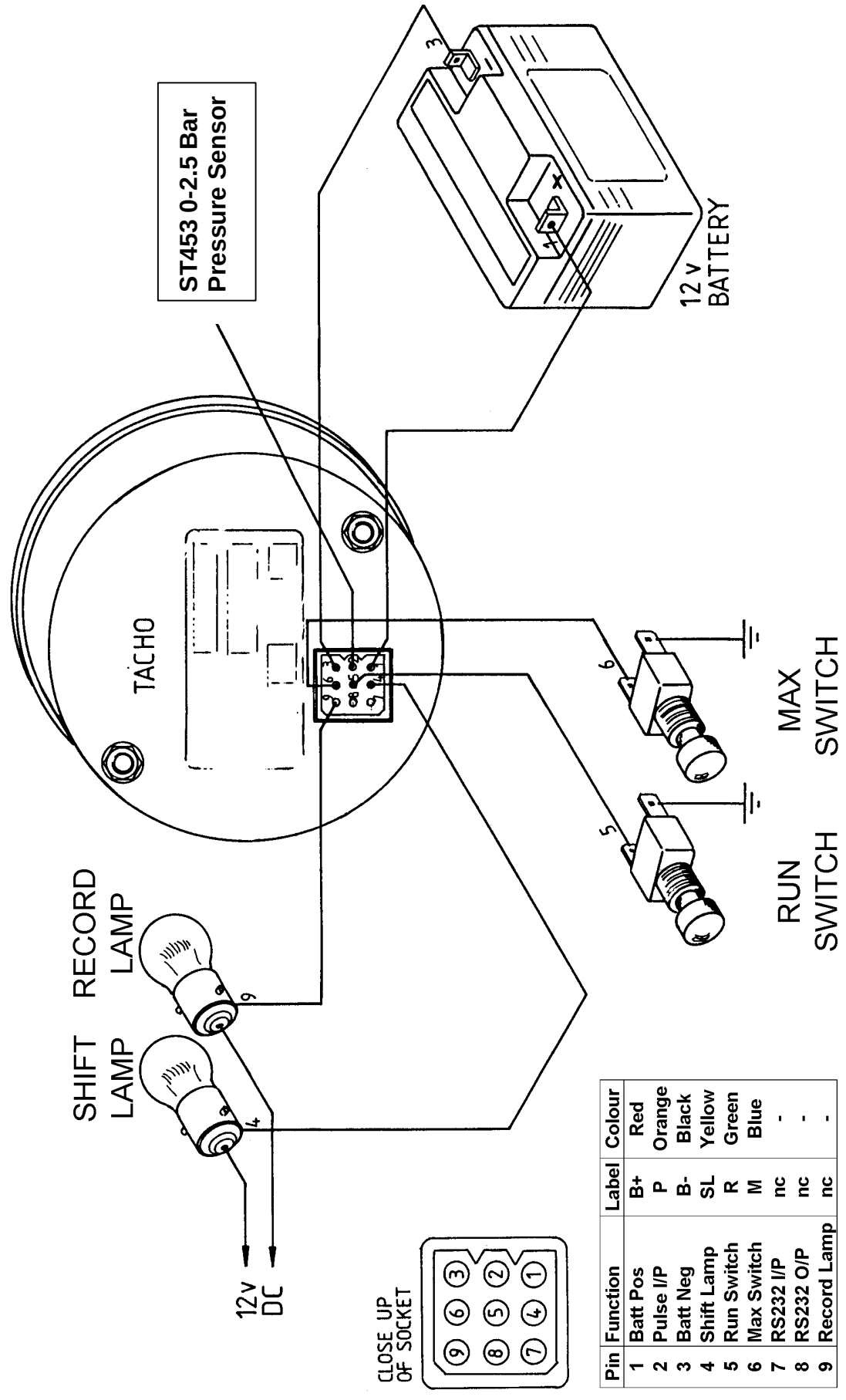
Reset Boost gauge The Reset Boost gauge feature may be used to reset the memory of the Boost gauge at any time. The Boost gauge is reset by pressing the **R**eset switch while power is applied.

TECHNICAL SPECIFICATIONS

ALL MODELS - Unless otherwise specified

Operating Temperature	-20 deg C to +70 deg C
Storage Temperature	-40 deg C to + 80 deg C
Accuracy	Linear dials +/- 0.6% over temperature range Non linear dials +/- 0.45% over temperature range
Humidity	0-95% Non-condensing
Vibration	10-55Hz 5mm pk; 55Hz-1KHz 30g 12 hours
Supply	0.25 Amperes @ 8-16 Volts D.C.
Nett Weight	400 grams
Dimensions	88mm (3.5in) diameter x 75mm (3.0in) deep
Fixing details	80mm (3.15in) diameter cut-out
Backlighting	Solid-state green LED
Over boost Limit	User adjustable within the range of the dial face
Electrical Outputs	Pseudo open collector type (200 mA current sink maximum switched to battery negative)

Appendix A - Connection Details



Pin	Function	Label	Colour
1	Batt Pos	B+	Red
2	Pulse I/P	P	Orange
3	Batt Neg	B-	Black
4	Shift Lamp	SL	Yellow
5	Run Switch	R	Green
6	Max Switch	M	Blue
7	RS232 I/P	nc	-
8	RS232 O/P	nc	-
9	Record Lamp	nc	-

Appendix B - Troubleshooting

No.	Symptom	Possible Cause	Remedy	Notes
	Gauge Operation			
1	Display is dead or needle resets-vibrates or No green backlight	Battery is dead or almost dead	Recharge or replace battery	Check if battery is connected. Check power lead continuity
2	No reading	Incorrect wiring.	Check the connection of the boost sensor ST453	
3	Boost gauge powers up OK but resets constantly when the engine is running	Intermittent supply wiring to gauge.	Check the 9w Pins & sockets for dirt. Check sockets for damage or if opened out	
		Battery failing under vibration or load.	Replace battery with known good unit	
4	Over boost Light doesn't come on	Over boost limit set to high	Set limit to required boost	

Returned Goods Form

In the unlikely event of a Stack part developing a fault and requiring repairs, you are kindly requested to send the part back to Stack or your dealer with a completed Returned Goods Form. Returning a part without this form will lengthen the repair time and possibly increase the cost of the repair.

Company	_____	Customer	_____
Address	_____	(if different)	
	_____		_____
	_____	Contact	_____
	_____		
	_____	Tel No.	_____
Contact	_____	Fax No.	_____
Tel No.	_____		
Fax No.	_____	Return Date	_____

Details of part being returned

Part No. _____
Serial No. _____
Description _____
_____
_____
Other accessories included _____
(i.e. bracket, switches, etc.) _____
_____
_____
_____

Details of Fault

Please complete as fully as possible. This will speed the repair and return of the parts.
Description of fault _____
_____
_____
_____
_____
_____
_____
Details of vehicle _____
_____
_____
_____
_____
Circumstances leading to fault _____
_____
_____
_____

Stack use only

Engineer _____ Service No. _____ Date _____

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